Modeling and Simulation in C2 Acquisition Analysis & Test

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Development Planning

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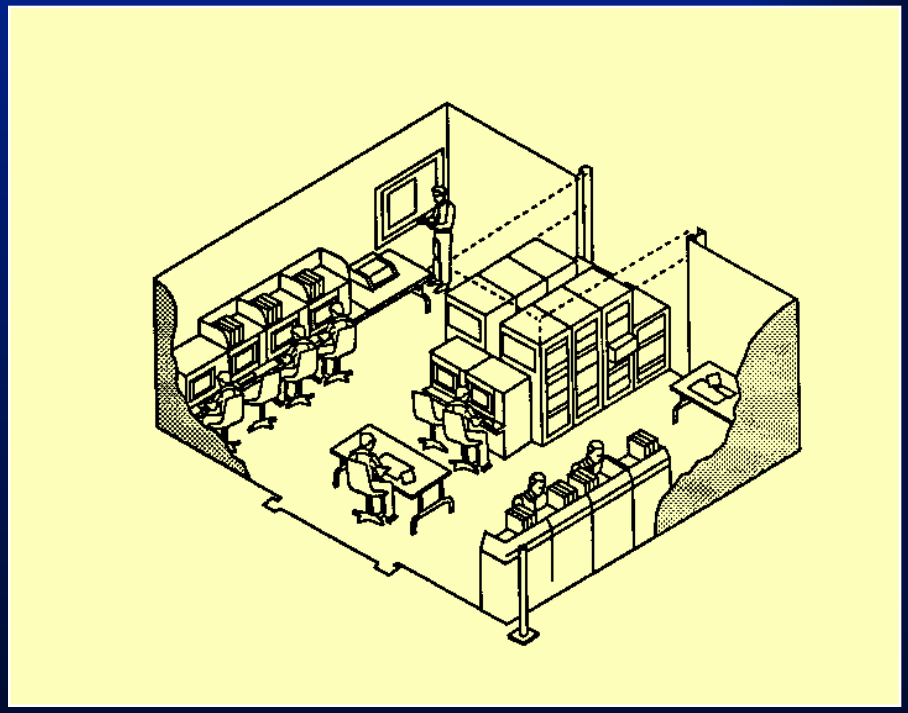
Purpose

- **Describe the CUBE and MASC**
- **Show MASC/CUBE role in COP study methodology**
- **Discuss current CUBE support to the warfighter**

The Command and Control Unified Battlespace Environment (CUBE)

- **Live facility:**
  Actual hardware, operators in loop
  - **H/W: All ESC C2 equipment avlble**
  - **Operators: ESC, AFRES**
- **Reconfigurable:**
  Replicate any C2 node
  - **AOC**
  - **WOC**
  - **SqOC**



CUBE Mission/Goal

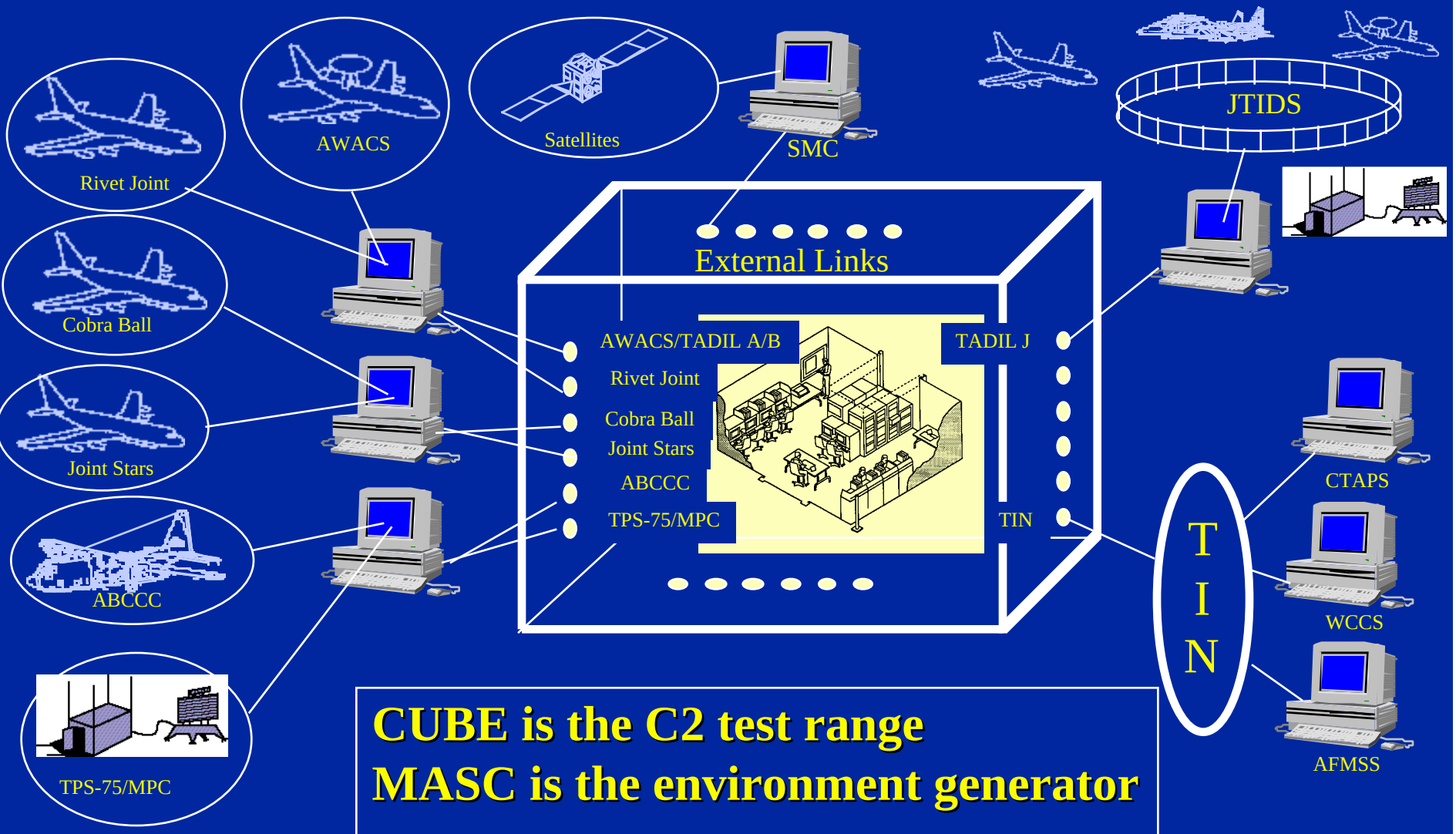
Ensure the Air Force builds effective C2 systems that are ***integrated, interoperable, value added technology as needed*** for joint & coalition operating environments

Bring operators, developers and industry together to ***improve warfighter performance***

Modeling, Analysis and Simulation Center (MASC)

- Vision: Center of Excellence for C2 Modeling, Simulation, and Analysis
- Constructive facility:
  - E.g., Thunder, EADSIM, ADSIM
  - Government, FFRDC (MITRE), contract support
- Customer Base includes BMDO, JTAMDO, OSD C4ISR DSC, ISR TPIPT
  - And the CUBE...

MASC/CUBE Interplay



CUBE is the C2 test range
MASC is the environment generator

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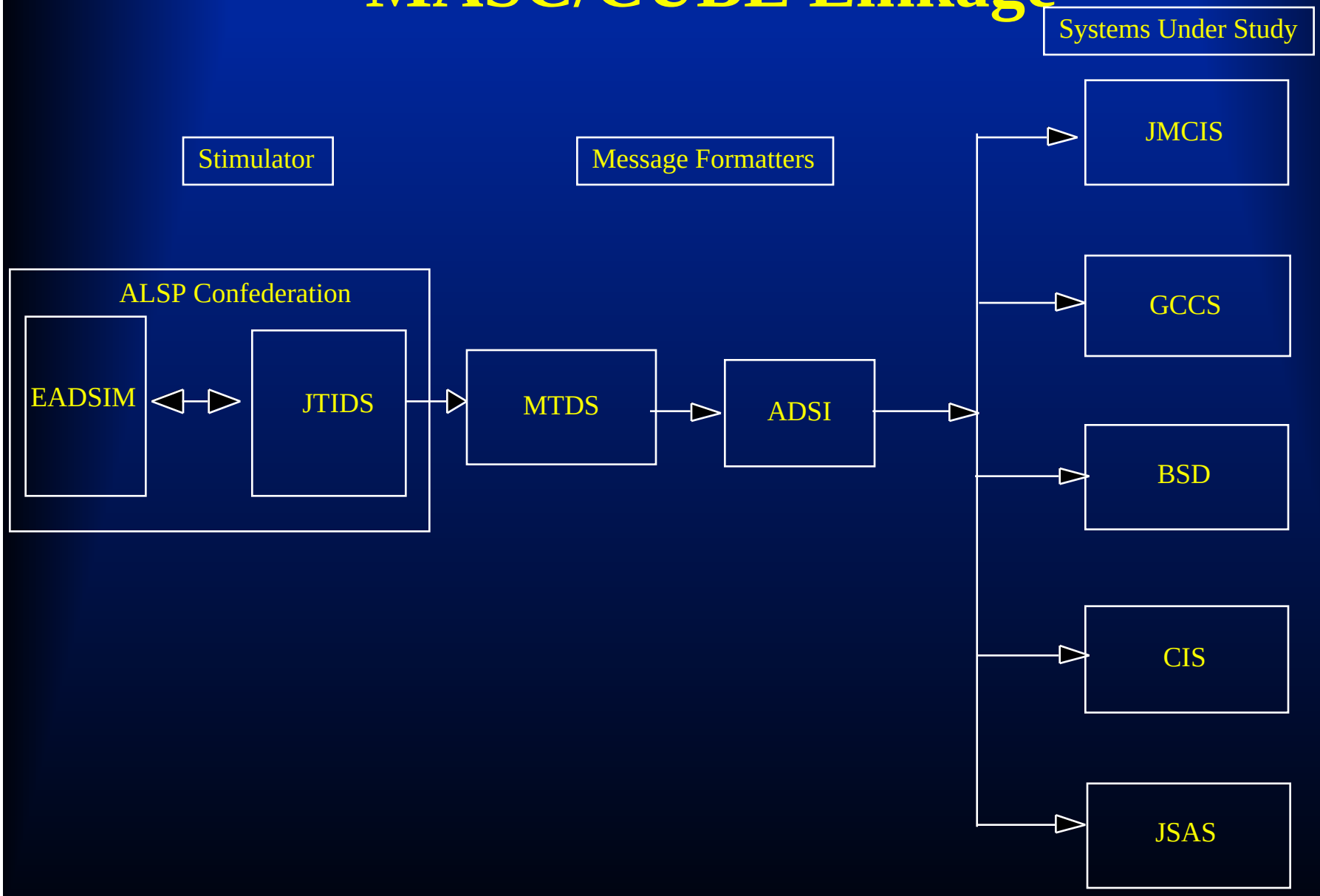
Common Operating Picture (COP) Study Overview

- Sponsor: AFPEO/BA
- Tasking:
  - Assess how to incorporate GCCS into USAF C2 to satisfy the COP requirement
  - Examine existing systems to highlight potential delta improvements
  - Refine AF/Joint COP requirements
- Systems in Study
  - Combat Intelligence System
  - Battlefield Situation Display
  - Global Command and Control System
  - Joint Maritime Combat Information System
  - JFACC Situational Awareness System

COP Study Methodology

- Generate theater scenarios in MASC:
  - Air traffic, including airborne sensors
  - Message traffic, including sensor detection reports
- Stimulate COP tools with increasing volume, density of air/message traffic
- Observe COP tool performance:
  - Timeliness
  - Accuracy
  - Correlation
  - Functionality
  - Ease of Operator Use
- Solicit user assessment of requirements deltas (“must have” vs “useful” vs “eh”)

MASC/CUBE Linkage



Lessons Learned

- Obtaining latest versions of systems is difficult
- On-site, knowledgable support is essential
- Instrumenting for measurement is critical
- Modeling and Simulation requirements are extensive
- System of systems environment allowed real-time discovery and resolution of interoperability and performance problems
- Studies like this can provide decision makers with objective data

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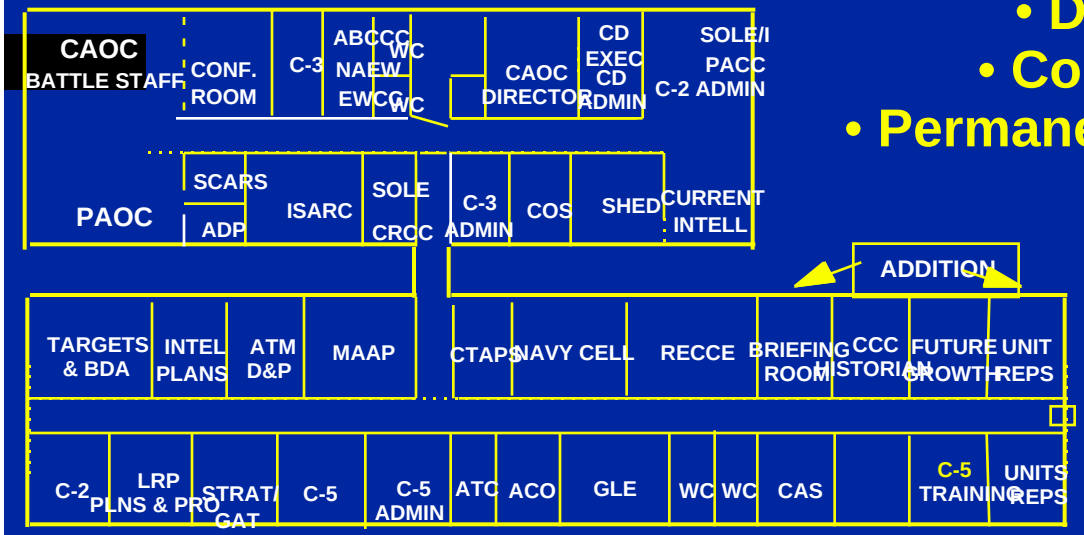
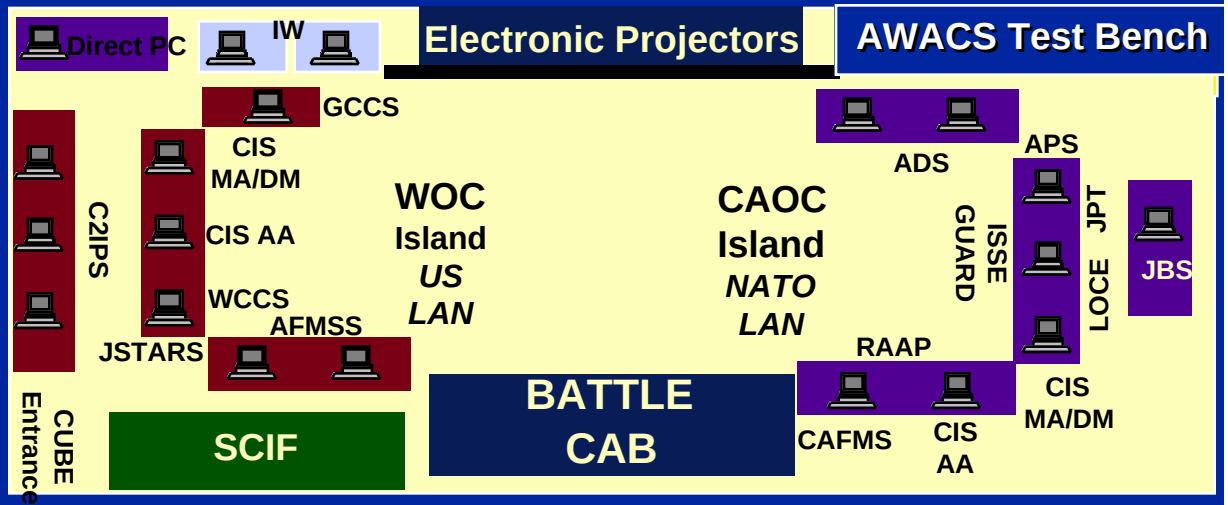
CAOC Emulation & Liaison

Two-way communicator on-site Apr 96
- **Document requirements**
- **Coordinate CUBE activities**
- **Permanent presence: 90-day rotation**



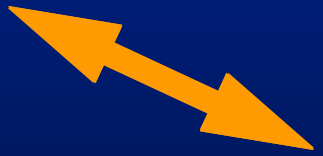


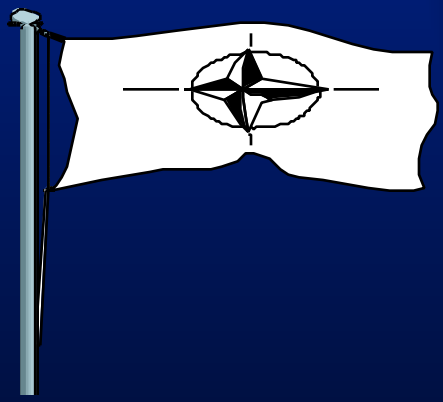
CAOC ISSUES

- Dec 95: Identified 28 top issues, problems in Joint C2 set-up
- Dec 96: Closed 28
- FY97: 17 New
- Particular successes:
  - GUARD TECHNOLOGIES (#1)
  - ATM DISSEMINATION (#2)

Solved Issue #1

ESC





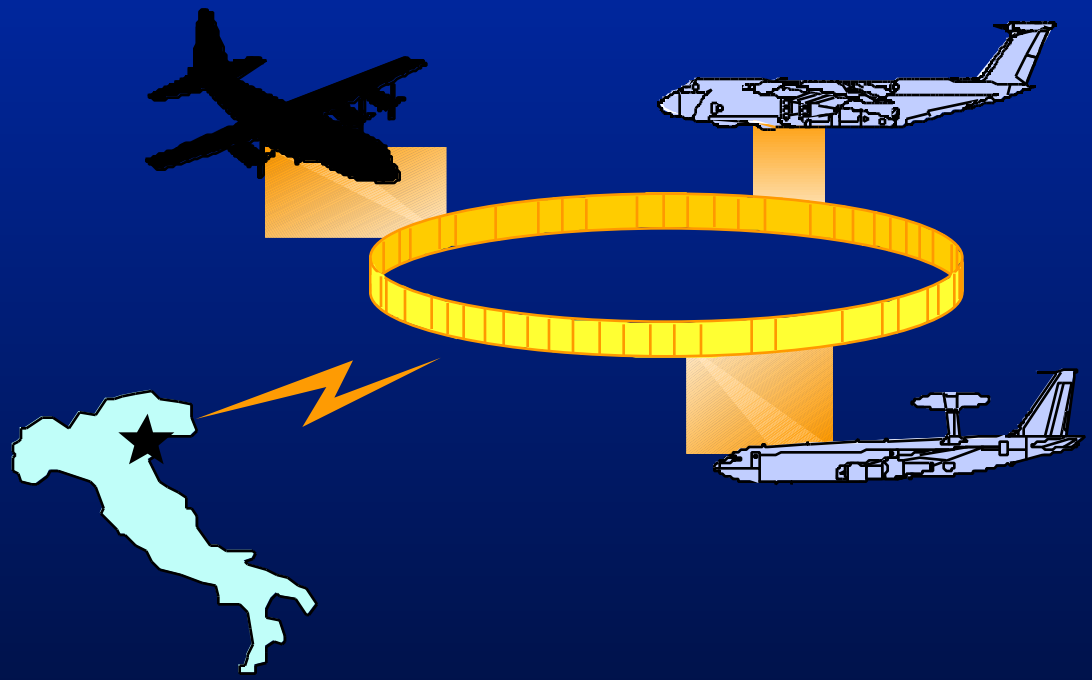
Issue: **Transfer Data Between US Secret and NATO Secret Networks**

Solution: **Tested Guard at CUBE for Installation at CAOC**

Impact: **Will Allow for More Efficient Tasking of Coalition Air Assets**

ESC

Solved Issue #2

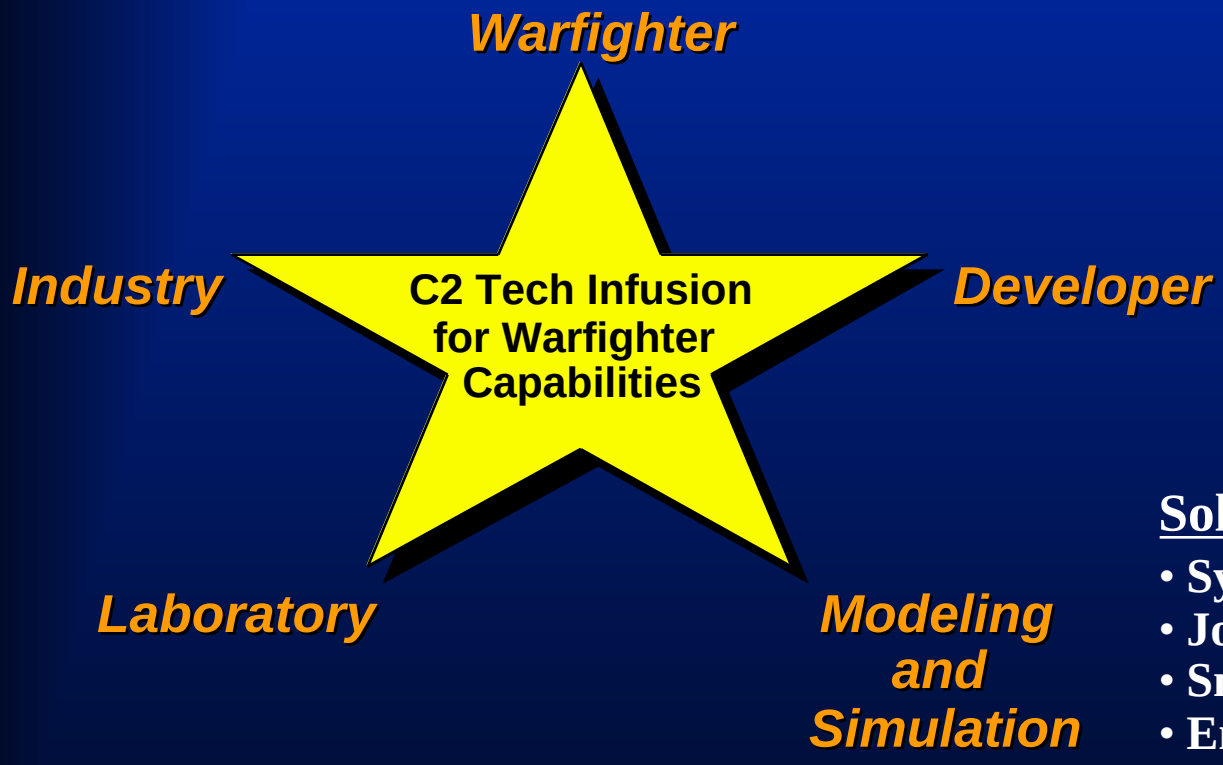


Issue: **Electronically Transfer Air Tasking Message to Airborne Command and Control Aircraft**

Solution: **Testing JTIDS Link 16 Interface with Aircraft Terminal in CUBE**

Impact: **CAOC Commander Redirects Aircraft Rapidly and Efficiently**

END GOAL:
Field Military Capabilities - Rapidly and Effectively

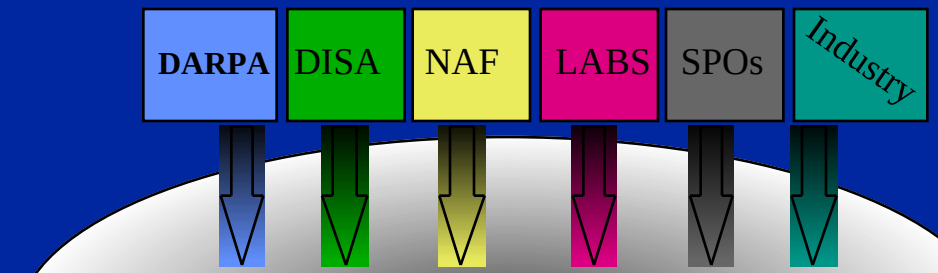


Solution Characteristics

- Systems Integrated
- Joint/NATO interoperability
- Smaller footprint
- Enhanced data sharing
- Disciplined delivery process
- Configuration management

BACKUP SLIDES

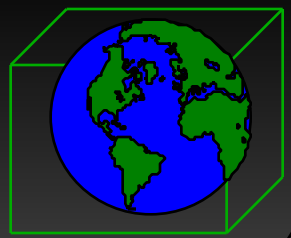
CUBE: AF C2 BL TECH INFUSION POINT



Increasing DII COE

Increasing Integration and Interoperability

Increasing Warfighter Involvement



The AF C2 BL

Global Customers